Mountaintop Mining/Valley Fill Environmental Impact Statement
Technical Study

WORK PLAN APPROACH FOR AQUATIC ECOSYSTEM ENHANCEMENT

October 1999

I. Problem Statement

A typical mountaintop mining operation in the Appalachian coalfields removes overburden and interburden material to facilitate the extraction of low-sulfur coal seams, and has often required the placement of excess spoil into valleys containing first and second order streams. A key goal of permitting processes is to protect the physical, chemical, and biological effects of these operations on downstream reaches. In an attempt to offset loss of stream reaches and associated biological values due to filling, compensatory mitigation projects involving stream restoration has been required in many cases. However, the effectiveness of the measures to protect downstream reaches and to assure mitigation of aquatic ecosystem losses due to filling is uncertain. In addition to identification of improvements in mining/filling operations to protect downstream waters, increased attention should be given in the mining reclamation process to the potential for aquatic ecosystem enhancement by re-creating streams and related aquatic biological conditions and functions on mine sites and previously-mined areas.

First and second order headwater streams receive and transport a major portion of the downstream biological energy budget from leaf litter and other terrestrial sources of carbon, and downstream biological communities have become adapted to existing physical, chemical, and biological conditions within these stream arrays. If it is determined that downstream invertebrate (and thus vertebrate) communities are being adversely affected by MTM/VF activities in such reaches, aquatic ecosystem enhancement actions on mining and fill sites should be targeted at replacement of the lost biological energy sources needed for protection of the downstream biological communities. (Note that the farther downstream in a given system the fills extend, the greater the likelihood that significant vertebrate species populations were affected. Therefore, replacement projects would have to consider additional aquatic values.)

II. Goals of the EIS related to Aquatic Ecosystem Enhancement

-- Assess mining and reclamation practices to show how mining operations might be carried out in a way that minimizes adverse impacts to streams and other environmental resources and to local communities. Clarify economic and technical constraints and benefits.

-- Help citizens clarify choices by showing whether there are affordable ways to enhance existing mining, reclamation, mitigation processes and/or procedures.

-- Identify data need to improve environmental evaluation and design of mining projects to

protect the environment.

III. EIS Team Members and Experts Consulted

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EPA: Rebecca Hanmer, William Hoffman, Dan Sweeney, Hoke Howard
COE: Rodney Woods
FWS: David Densmore
OSM: Bernard Maynard
WVDEP: Ken Politan

Experts to be consulted: Ron Preston, Canaan Valley Institute; Dr. Steven Handel, Rutgers University; John Morgan; Horst Shor; Larry Emerson, Arch Coal; Eugene Kitts, Summit Engineering, Inc.; Daniel Cox, Massey Coal; Peter Lawson, Catenary Coal

IV. Approach

This work plan will augment the activities of the **Streams** and **Fisheries Survey** work plans. It will build upon the symposium held in the **Mining Technology** work plan. A meeting will be held with representatives from the stakeholders to outline plans for a symposium in the winter of 2000. The symposium will seek to bring experts together to focus on the subject of innovations in mine reclamation which could enhance aquatic ecosystems on coal mine sites. At least three innovative aspects will be explored:

1. making the fills and reclaimed lands look more like nearby naturally occurring features;

2. making the ditches, ponds and sediment structures function more like natural streams and wetlands;

3. making the lands adjacent to ditches, ponds, and streams function more like natural riparian zones.

To be successful, this work plan will require industry cooperation to survey sites, assess opportunities and initiate pilot projects.

V. Evaluation of Current Reclamation Practices

MTM/VF operations eliminate stream reaches existing within mined or filled areas. Sediment ditches are constructed to convey sediment loadings from the mined areas to sediment control structures including wetlands and ponds. These ditches, wetlands and ponds are typically removed after mining has been completed. The ecological value of these structures and the value of enhancing the current practices to expand habitat for aquatic and riparian wildlife have not been

well documented. A panel of experts will be called together to evaluate several existing reclamation sites seeking to enumerate the benefits of aquatic and riparian habitats there. They will also be asked to design an ideal reclamation plan for a mined site to incorporate innovations to enhance aquatic and riparian habitats and general improvement to the ecosystem at the site. These evaluations will supplement several other work plans including Mine Reclamation Technology, Streams, Terrestrial Habitats, Economics, and Landscape Ecology.

VI. Evaluation of Opportunities for Aquatic Ecosystem Enhancement

A. Survey of Candidate Sites by Mining Companies

The West Virginia Mining and Reclamation Association and the West Virginia Coal Association have been asked to survey stream restoration activities on mined sites. The intent of the survey is to provide information and examples which will be examined in the expert review process. Mining companies will be asked to prepare a list of specific sites which they consider most suitable for stream restoration and aquatic ecosystem enhancement. The existing and proposed sites would serve as case examples for examination in the Aquatic Ecosystem Enhancement Symposium.

B. Expert Review Process

The mine sites recommended by the mining companies will be reviewed by a team of five or more recognized experts in ecological and stream restoration. These experts will be asked to provide information on the ecological benefits as well as losses at the mined sites and present this information at an Aquatic Ecosystem Enhancement (AEE) Workshop with company and Federal-State environmental representatives. (Winter 2000)

Two approaches have been identified for particular attention: (1) the potential application of "Landforming" techniques as developed by construction consultant Horst Shor and presented in the June Mining and Reclamation Technology Symposium; and (2) stream restoration using "Rosgen" techniques. A planning session for the AEE Workshop will be held in September 1999, when a Rosgen expert will be leading a Canaan Valley workshop on stream restoration.

At the AEE Workshop, experts will be requested to outline the factors (environmental conditions, management practices) which would create the most successful stream restoration and aquatic ecosystem enhancement. A **Workshop report** will be prepared, outlining general principles for stream restoration and re-creation on mining sites, specifying indicators for evaluating the results of stream restoration and re-creation initiatives, and presenting the case examples.

C. Pilot projects

Based on the site inventory, and results of the workshop, the cooperating mining companies would be asked to undertake pilot projects on their lands. The pilot projects ideally should fall into three categories: (1) enhancements of existing stream restoration areas; (2) aquatic ecosystem enhancement projects in existing drainage ditches or on previously-mined and filled areas if

suitable candidate sites are found; and (3) new aquatic ecosystem enhancement pilot projects applying the Workshop principles at the pre-pilot stage e.g. during design of mining projects and valley fills. (Note that similar pilot projects may be initiated under the **Wetlands** work plan.)

Most, if not all, of the pilot projects could not be completed within the time frame of the programmatic EIS. Thus, they would be contributing to longer-term research. It is intended, however, to incorporate the findings and recommendations of the initial consultant information-gathering and the findings and recommendations of the expert workshop in the EIS.

VII. Projected Study Costs

The following cost projections are made for the AEE Workshop, and for expert evaluation of the selected pilot projects. Field work is proposed to be conducted by agency field crews and/or mining companies, and has not been included in the cost calculations. The projections do not include the costs of collecting, compiling, and evaluating existing data sets by the EIS contractor as these are included in the EIS Work Assignment. The projections also do not include the costs of implementing pilot projects, as it is proposed that mining companies will do this.

AEE Project Workshop: The assumptions are: (a) that Federal agencies will provide six experts at their own cost, and that the MTM/VF project will pay for four outside consultant experts; (b) that the workshop will be held at a Federal or State facility at no cost to the project; and © that the MTM/VF lead agencies will share responsibility for preparation and publication of the workshop report.

Based on:	4 consultant experts
	6 work-days each
	$1000/day consultant pay
	$2500 for workshop administrative expenses
	$1250 @ consultant for travel costs
Cost:	$31,500 for the workshop

Pilot Project Selection and Evaluation:

Based on :	6 pilot projects (selected/implemented by mining companies)
	36 consultant work-days (2 consultants x 3 field trips/pilot project)
	$1000/day consultant pay = $36000
	$3400 (+ in-area travel costs paid by companies)
Cost:	$40400

For further information regarding this work plan, please contact Gary Bryant.